

REMARKS

Reconsideration of this application, as amended, is respectfully requested.

Claims 40-61 and 69-85 have been canceled without prejudice.

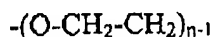
Claims 40-85 were rejected under §102(b) and §103(a) over Markusch. Applicants respectfully submit that this rejection has been rendered moot with respect to the canceled claims and traverse these rejections as to the remaining claims.

The Examiner alleges that Markusch discloses a polyurethane dispersion containing ingredients and having molar ratios, molecular weights and other properties that are alleged to be such that the obtained polyurethane necessarily possesses moieties that fall within the scope of the rejected claims.

According to the presently claimed process, the macromonomer (A)(ii) is used to start the process. The preparation by a three-stage preparation process results in several differences of the macromonomer (A)(ii) and the resulting polyurethane dispersion over Markusch. These include, for example, that the macromonomer is essentially free from by-products, turbidity of the prepolymer and of the resulting dispersion film are prevented, an optimum distribution of non-ionic stabilizer (macromonomer (A)(ii)) the polyurethane polymer is achieved, and the solids content of the resulting dispersions are higher compared to those of Markusch. Additionally, the Examiner's attention is drawn to Examples B.1 to B.4 of the present application in comparison to the Examples of Markusch. The properties of the products of the invention are clearly better than those obtained according to Markusch, particularly as to the solids content, solvents content and viscosity as well as elongation at tensile strength. Even if Markusch indicates in the general disclosure that a solid content of up to about 60% by weight can be achieved, all actual working examples show considerably worse values. The properties of the products obtained according to the presently claimed invention, by comparison, yield improved results.

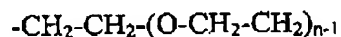
Applicants reiterate that neither the polyurethane dispersions nor the method of making them are disclosed by Markusch because, according to the presently claimed process, the specific macromonomer (A)(ii) is used as a starting material which is hydrophilic and solvent-free due to its three-stage preparation process.

Furthermore, the structural unit X in formula (I) (cf. col. 7, line 62 to col. 8, line 2) does not appear to be correctly described since a polyalkylene oxide chain does not have any terminal OH-groups. For example, a polyethylene oxide chain can be depicted as follows:



This molecule exemplifies polymeric ethylene oxide molecules without end groups which can also be characterized by the expression "polyalkylene oxide chain".

According to Markusch, X represents the radical obtained by removal of the terminal hydroxy group from a polyalkylene oxide chain. However, such removal of the terminal hydroxyl group does not result in a polyalkylene oxide chain but in the following molecule:



For this reason, it is not clear how the compound of formula (I) of Markusch is to be properly interpreted.

As previously indicated, Markusch does not disclose that component of (I) is prepared by a three-stage preparation process, and, therefore, the presently claimed process is not disclosed. Again, it is submitted that the presently claimed process results in at least the following differences of the macromonomer (A)(ii) and the resulting polyurethane dispersion over Markusch:

1. In contrast to the compound (I) of Markusch the macromonomer (A)(ii) is essentially free from by-products due to the specific composition of the hydrophilic alkyl- and/or aryl polyalkylene glycol (A)(ii), which is selective towards polysiocyanates.

2. The preparation process of the macromonomer (A)(ii) allows the full compatibility of all reactants and components, resulting in prevention of turbidity of the prepolymer and of the resulting dispersion film, respectively.

3. An optimum distribution of the non-ionic stabilizer (macromonomer (A)(ii)) in the polyurethane polymer is achieved.

4. The macromonomer (A)(ii) according to the invention differs from the examples disclosed in Markusch in that it is solvent-free. In contrast thereto, the prepolymers obtained according to Markusch contain N-methyl-pyrrolidone.

5. According to the Tables III, IV and V of Markusch the dispersions of Examples I to V of Markusch are less stable than the polyurethane dispersions according to the presently claimed invention.

6. The solids contents of the resulting dispersions disclosed in Markusch are between 35-39%. In contrast, the solids contents of the dispersions of the invention are $\geq 50\%$.

Consequently, Markusch neither discloses the hydrophilic and solvent-free macromonomer (A)(ii) nor the polyurethane dispersion which is prepared by this starting material.

Furthermore, Markusch does not provide any hint or suggestion to the skilled artisan that the use of a hydrophilic and solvent-free macromonomer (A)(ii) for the preparation of a polyurethane dispersion brings about many advantages. In particular, Markusch, as previously

noted, does not disclose or suggest that the prepolymer (A)(ii) should be prepared by a three-stage preparation process.

It has been found that through the preparation and use of a hydrophilic and solvent-free macromonomer (A)(ii) with a molecular mass distribution in accordance with reaction stages a_1 and a_2) in conjunction with a three-stage preparation process for the polyurethane prepolymer in accordance with reaction stages b_1) to b_3) the following advantages for the obtained polyurethane dispersions of the invention results:

no byproducts during the preparation of the macromonomer (A)(ii), owing to the specific composition of the hydrophilic alkyl- and/or arylpolyalkylene glycol (A)(i), which is selective toward polyisocyanates;

compatibility between nonionic stabilizer (macromonomer (A)(ii)) and polyurethane backbone even during the synthesis of the polyurethane prepolymer;

optimum arrangement/distribution of the nonionic stabilizer (macromonomer (A)(ii)) in the polyurethane polymer as a result of a three-stage preparation process for the polyurethane prepolymer;

overall very low stabilizer requirement (anionic+nonionic) and comparatively very low hydrophilicity;

no coagulation at pH 1-14;

true dispersion: high solids contents at low viscosity, owing to very low stabilizer requirement (anionic+nonionic) (cf. prior art: solutions: high viscosities at high solids contents, owing to very high stabilizer requirement);

completely VOC-free binders are obtainable;

high long-term storage stability (cf. prior art: slow destabilization as a result of byproducts in nonionic stabilizers);

resistance to hydrolysis, and low-temperature flexibility, in comparison with acrylate-based binders for similar applications;

profile of properties, material properties, and processing characteristics are influenced positively as a result of innovative polymer structure.

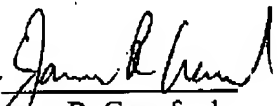
Thus, all rejections should be withdrawn.

In view of the foregoing, allowance is respectfully requested.

The Commissioner is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 50-0624, under Order No. NY-HUBR-1286-US.

Respectfully submitted

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